

# Concurrency issues

## Concurrent Modification Exception:

When two threads try to add/modify the contents of Object then we will get a Run-time exception saying `ConcurrentModificationException`.

I solved this issue using:

- `ConcurrentHashMap`, in `EmployeeCache`
- `PriorityBlockingQueue`, in `EmployeeCache`
- `LinkedBlockingQueue`, in `BasicConnectionPool`

## Creating a new thread dependance object for each task:

I solved this issue using `ThreadLocal` to store data individually for the current thread.

- `ThreadLocal<EmployeeMySqlRepository>`, in `ClientRunnable`.
- `ThreadLocal<Gson>`, in `ClientRunnable`.

## Reading singleton instance from the cpu cache:

I solved this issue in `EmployeeCache` and `BasicConnectionPool` using `volatile` keyword to mark the singleton instance as "being stored in main memory".

## Creating a new instance when using singleton with multithreading:

I solved this issue in `EmployeeCache` and `BasicConnectionPool` using `synchronized` keyword to be sure that we have only a single instance.